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Citation

Li, Jia, Catherine Snow, and Claire White. 2015. "Teen Culture, Technology and Literacy Instruction: Urban Adolescent Students' Perspectives." *Canadian Journal of Learning and Technology / La Revue Canadienne de L'apprentissage et de La Technologie* 41 (3) (October 31). doi:10.21432/t2004h.

Published Version

<http://dx.doi.org/10.21432/T2004H>

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Teen Culture, Technology and Literacy Instruction: Urban Adolescent Students' Perspectives

Culture, technologie et instruction en littératie chez les adolescents : points de vue d'élèves adolescents urbains

Jia Li, Faculty of Education, University of Ontario Institute of Technology

Catherine Snow, Harvard Graduate School of Education, Harvard University

Claire White, Strategic Educational Research Partnership, MA, USA

Abstract

Modern teens¹ have pervasively integrated new technologies into their lives, and technology has become an important component of teen popular culture. Educators have pointed out the promise of exploiting technology to enhance students' language and literacy skills and general academic success. However, there is no consensus on the effect of technology on teens, and scant literature is available that incorporates the perspectives of urban and linguistically diverse students on the feasibility of applying new technologies in teaching and learning literacy in intact classrooms. This paper reports urban adolescents' perspectives on the use of technology within teen culture, for learning in general and for literacy instruction in particular. Focus group interviews were conducted among linguistically diverse urban students in grades 6, 7 and 8 in a lower income neighborhood in the Northeastern region of the United States. The major findings of the study were that 1) urban teens primarily and almost exclusively used social media and technology devices for peer socializing, 2) they were interested in using technology to improve their literacy skills, but did not appear to voluntarily or independently integrate technology into learning, and 3) 8th graders were considerably more sophisticated in their use of technology and their suggestions for application of technology to literacy learning than 6th and 7th graders. These findings lead to suggestions for developing effective literacy instruction using new technologies.

¹ Major recent studies in U.S. regarding technology use and the general population of teens have been conducted by Pew Research Center's Internet & American Life Project, which results provide much insight into the present study. Their teen participant sample aged between 12 and 17. In this article, we also refer student participants in a middle school whose ages range from 12 to 14 as teens. There is a one-year difference in the starting age by the traditional concept of teenagers aged 13-17.

Résumé

Les adolescents modernes ont, de façon généralisée, intégré les nouvelles technologies à leurs vies, et la technologie est devenue une composante importante de la culture populaire chez les adolescents. Les éducateurs ont signalé la promesse que représente l'exploitation de la technologie pour améliorer les compétences des élèves en langue et en littérature ainsi que leur succès scolaire global. Il n'existe toutefois aucun consensus sur l'effet qu'a la technologie sur les adolescents, et peu d'études qui intègrent les points de vue d'élèves urbains et linguistiquement variés quant à la faisabilité d'appliquer de nouvelles technologies dans l'enseignement et l'apprentissage de la littérature dans les salles de classe intactes. Cet article rapporte les points de vue des adolescents urbains sur l'usage de la technologie au sein de la culture adolescente, pour l'apprentissage en général et l'instruction relative à la littérature en particulier. Des entrevues en groupes de discussion ont été réalisées auprès d'élèves urbains linguistiquement variés en 6e, 7e et 8e année dans un quartier au revenu relativement faible d'une région du Nord-est américain. Les conclusions principales de l'étude ont été 1) que les adolescents urbains utilisaient les médias sociaux et les appareils technologiques principalement et presque exclusivement pour socialiser avec leurs pairs, 2) qu'ils étaient intéressés par l'utilisation de la technologie pour améliorer leurs compétences en littérature, mais ne semblaient pas intégrer la technologie dans leur apprentissage de façon volontaire ou indépendante et 3) que les élèves de 8e année utilisaient la technologie et formulaient des suggestions d'application de la technologie à l'apprentissage de la littérature de façon nettement plus sophistiquée que les élèves de 6e et de 7e année. Ces conclusions mènent à des suggestions pour le développement d'une instruction efficace en littérature à l'aide des nouvelles technologies.

Introduction

Emerging technologies have become increasingly embedded in urban adolescents' lives, as shown by the time teenagers spend in virtual space, juggling multiple devices and software applications (e.g., Greenhow, Walker, & Kim, 2009; Lenhart, 2012; Lenhart, Ling, Campbell, & Purcell, 2010). The advances in mobile technology have provided teens with pervasive virtual communication and socialization via mobile devices. A survey from the Pew Internet and American Life Project (PIALP) (Lenhart, 2012), based on a nationally representative sample of 799 teens aged 12-17, showed a steady growth of overall mobile phone ownership, with 77% of teens having a mobile phone in 2011 compared with 45% in late 2004. Sixty-three percent of the U.S. teens exchanged text messages with people every day, and the mean daily volume of text messages significantly increased from 112 in 2009 to 167 in 2011. Text messaging is viewed by teens as a vital form of socializing and communication with friends (Lenhart, 2012). When surveyed about possession of mobile phones, mp3 players, computers, game consoles, and portable gaming devices, the respondents aged 12-17 reported owning 3.5 gadgets on average (Lenhart et al., 2010). It is evident that technology is embraced by teenagers as an indispensable part of their lives and culture (Considine, Horton, & Moorman, 2009).

Recent research has shown that young people have adopted technology more rapidly and more universally than adults. For example, three studies conducted at the Pew Research Center during 2006-2008 showed that American youth aged 12-17 were "the most fervent users" of social media, at a far greater percentage than users aged over 18 (65% vs. 35%) (Lenhart, 2009). A

study conducted in Canada also revealed that youth aged 9-18 spent significantly more time on Facebook than adults aged 19-71 (Christofides, Muise, & Desmarais, 2010). Additionally and surprisingly, no significant differences in using social media were found among American teens as a result of their different family income levels (Lenhart, 2009). A study of 518 Belgian 16- to 19-year-old students also showed that “socioeconomic status affects computer ownership only moderately” (Van Braak & Kavadias, 2005, p. 43). Our recent survey study with 531 middle school students aged between 12 and 14 in a U.S. public school located in a lower income neighborhood also revealed that the digital divide related to social economic status (SES) is disappearing, as these low-income urban teens’ access to technology devices was comparable to that in the general teen population (Li, Snow, & White, 2014).

This rapid change in the use of technology among teens has in turn placed more literacy demands on adolescents. In a report to Carnegie Corporation of New York focusing on action and research in middle and high school literacy, Biancarosa and Snow (2006) pointed out:

Technology is both a facilitator of literacy and a medium of literacy... technology is changing the reading and writing demands of modern society. Reading and writing in the fast-paced, networked world require new skills unimaginable a decade ago. (p. 19)

In light of estimates that 70% of adolescents in the U.S. struggle with reading and require differentiated instruction, in particular those who attend urban schools and who are not from English-speaking homes (Biancarosa & Snow, 2006; National Center for Education Statistics, 2005), widespread technology use and the attendant need to process large amounts of information via the Internet and diverse social media forums may exacerbate the formidable literacy challenges of the middle grades.

The enthusiasm with which urban teens, including English language learners, embrace opportunities to use and learn about new technologies stands in stark contrast to their low motivation in school, related to academic underachievement and challenges in learning literacy skills (Li, Snow, & White, 2014). Literacy, in this article, refers to the ability to “read and write across a wide variety of disciplines, genres, and materials with increasing skill, flexibility, and insight” (Snow & Biancarosa, 2003, p. 5). Literacy skills have traditionally been taught mainly through English language arts (ELA) classes. At the school where this study was conducted, students from both mainstream ELA classes and ELA classes for English Language Learners (ELLs) participated. ELA classes for ELLs are officially referred to as Sheltered English Immersion classes or Sheltered English Instruction. The participating ELA teachers followed the Massachusetts Curriculum Framework for English Language Arts and Literacy (Massachusetts Department of Elementary and Secondary Education, 2011) and provided explicit instruction to support students to develop reading, writing, and speaking skills. The middle school ELA program emphasizes proficient academic English language reading and writing skills.

These literacy skills are critical for effective reading and writing across the curriculum, and they are necessary for adolescent students to succeed academically and individually, especially given twenty-first century challenges of technology use and global communication (Li, 2013). Twenty-first century skills include analyzing, evaluating, and synthesizing information, not only from print, but across multimodal sources (Goldman, 2012; Lesaux, 2012). Students in U.S. public schools where half or more students were eligible for free or reduced-price lunch had a

lower mean score in reading than students in countries included in the 2011 report of Organization for Economic Cooperation and Development (OECD, 2011) and the general student population in the U.S. (Fleischman, Hopstock, Pelczar, & Shelley, 2010). Literacy educators pointed out that it is due to their limited literacy skills that urban adolescents from low-income homes continue to underperform academically, starting especially in the middle grades (e.g., Goldman, 2012; Lesaux, 2012; Snow & Biancarosa, 2003), when they are required to comprehend and synthesize significantly longer and more complex academic texts in content areas (Carnegie Council on Advancing Adolescent Literacy, 2010). These same students' motivation and skills in technology use suggest the value of examining whether they would be interested in using technology to improve their literacy skills. Research on technology use has been conducted among the general youth population; however, it is critical to understand how urban adolescent students interact with new technologies, and how they juxtapose technology use for learning with teen culture—in order to profile the conditions for the development of technology-assisted instruction to support their learning of literacy skills.

Literature Review

Technology Use and Teen Culture

In this information era, technology is not merely embodied in sleek and high-end consumer products and gadgets; the ownership and use of these new technologies is instrumental to establishing teens' social status and developing their identities (Bauerlein, 2009). This is in part achieved through negotiating and constructing expressions of cultural symbols that may make them feel connected or disconnected with their peer groups (Poster, 2004); and they all have impact on how teens view who they are, who they can potentially be, and correspondingly, how they will interact with the world (Baudrillard, 1998). Technology devices, as teens' primary means of social contact (e.g., Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013), have become a significant cultural symbol of their status among peers and thus have a large impact on their identity development. Peer friendships also play a very important role in their personal and social development (Mota & Matos, 2013). For teens, having access to insider knowledge of their own circle is so important that, without it, they can feel "out of the loop" or experience alienation (Bauerlein, 2009, p. 20; Lewis & Fabos, 2005). Teens experience great peer pressure; they are very concerned about what is going on among peers and what others think of them. The ownership and use of technology are essential to teens as they try to identify with and confirm their acceptance by their peers. After telephone surveys with 2054 teens aged 12-18 years in Spain and group discussions with teens in secondary schools, Sánchez-Navarro and Aranda (2012) succinctly pointed out:

Youth perceptions about their own use of digital technologies show characteristic forms of management of their social needs related to being a teenager, as well as the construction of their own codes and communication protocols. (p. 67)

New technologies have redefined teens' social connections in unparalleled ways, leading to significant changes in their teen culture. As early as 2001, seventeen million teens in the U.S. aged between 12 and 17 used the Internet; among Internet users, 48% thought their use of the Internet improved their relationships with friends, and 32% said it helped them make new friends (Lenhart, Rainie, & Lewis, 2001). A 2006 survey with a nationally representative sample of 935

teens aged 12 to 17 showed that 93% used the Internet, and “more of them than ever are treating it as a venue for social interaction – a place where they can share creations, tell stories, and interact with others” (Lenhart, Madden, Macgill, & Smith, 2007, p. i). A recent report from a nationally representative survey of 802 teens aged 12-17 showed that 78% of U.S. teens had a mobile phone, and 47% of these teens owned smartphones. About 74% of these teens reported that they accessed the Internet using mobile phones, tablets, and other mobile devices (Madden et al., 2013). Teens can maintain and build social connections electronically, for example, carrying on conversations with peers that would be awkward or embarrassing if held face to face. The rapid development of mobile technology has created diverse ways for teens to deftly interact with friends and has greatly enriched their social life.

Greenhow, Walker and Kim’s study (2009) of 852 teens from low income households, showed that 82.9% of them had desktop computers; 35.5% had laptops; 63.9% had mobile phones; and 7.9% had personal digital devices. More than half of those teens reported that they went online at least once a day, and the majority reported some level of expertise with Internet-based technologies. When asked how important they felt the Internet was to their lives, many of them held views similar to those of the general teen population, saying that the Internet helped them connect with friends and peers. Interestingly, Lenhart’s study (2012) found that teens from households with less than \$30,000 annual income were heavier texters than those from households with higher income levels. Therefore, teens from low-income backgrounds, though they may have to share technology with families and have less access to the Internet than more advantaged teens, are not excluded from the integration of new technologies into their lives and group culture.

Group differences in technology adoption associated with age have been reported among youth. A self-report survey conducted among 531 middle school students showed that 8th graders (14-year-olds) reported significantly more access, more frequent use, higher levels of ownership of technology devices and social media accounts than 6th and 7th graders (12-13 year olds) (Li, Snow, & White, 2014). Livingstone and Helsper’s (2007) study with 1,511 students aged 9-19 in the U.K. showed 74% of them had Internet access at home. Frequency of Internet use only for students with home access did not differ by SES, but did differ by age. A higher percentage of teens aged 12-15 used the Internet than older (18-19) and younger (9-11) groups (99% versus 92% and 96%). When measured on a scale of 1-8, teens aged 12-15 also reported using the Internet more frequently than the student groups aged 11-12 and 18-19 (6.22 versus 5.30 and 5.66) (Livingstone & Helsper, 2007). To explore how youth use new technologies and their real value in their daily lives, Green and Hannon (2007) conducted focus group interviews with 60 children and youth aged 7-18 and 600 parents in the U.K. They classified respondents into four types of technology users: Digital pioneers, creative producers, everyday communicators and information gatherers. While pointing out a student can be a multi-type user, Green and Hannon (2007) found a gap between “a smaller group of digital pioneers engaged in ground breaking activities” (p. 10) and the majority of young people who were conventional communicators, and used technology to facilitate social interactions. The digital pioneers crossed the boundary of consumers and creators, and can be identified by their main characteristics: Self-motivation, ownership, purposeful creativity and peer-to-peer learning. It is this unique group, suggested Green and Hannon, that school administration and head teachers should learn from, as they are “seeds of change” (p. 46) for innovative teaching and learning that schools need to build on. The study conducted by Greenhow, Walker, and Kim (2009) also indicated a similar gap in

“students’ sophistication in their understanding of technology or Internet-use strategies” (p. 66). To sum up, it is clear that although new technologies have permeated teen lives and certain teen uses of technology appear to represent their collective identity and culture (i.e., texting, and social networking), variation among teens in technology use is influenced strongly by developmental and less strongly by socio-economic factors.

Effective Literacy Practices Using New Technology for Teens

Despite some variation across student groups in technology use competencies, new technologies have been increasingly integrated into classroom literacy instruction. Labbo and Reinking (1999) proposed the term “multiple realities” (p. 479) to demonstrate the “complexity and variation” (p. 479) in the intersection of technology, literacy, and literacy instruction. The multiple realities are well represented by a research strand investigating the influences of technology-enhanced literacy practices on students’ learning motivation, engagement and identity transformation, as well as a strand of studies focusing on the role of technology in the development of specific literacy skills, such as vocabulary acquisition and reading comprehension skills. For example, Curwood and Cowell (2011) examined how to integrate iPoetry in a 10th grade English class by incorporating photos and graphics, video clips, audio narration, and supporting written text; Danzak (2011) conducted a graphic storytelling project using multimodal information to engage middle school English learners in authentic writing practices. The iPoetry project was found to be effective in fostering students’ engagement by inviting them to bring their own voices into the regular English classroom; the multimodal storytelling project showed that students were able to express themselves meaningfully, collaboratively edit each other’s writing and improve various aspects of English syntax, spelling, and mechanics for the written text. The results of both studies further demonstrated that the multimodal representations of knowledge enabled by technology encouraged student discussions and thus enhanced their in-depth understanding and conceptualization of ideas, and enabled students to explore different ways to interpret messages with the awareness of audience and readership. Ultimately, the instruction provided students with meaningful ways to express their identity and simultaneously engage with the learning of literacy skills.

Recent research has demonstrated the promising potential of integrating a variety of technologies into literacy instruction for teens/secondary school students in order to enhance their learning of more specific language skills, including vocabulary (e.g., Li, 2010; O’Hara & Pritchard 2008), reading (e.g., Dalton, et al. 2002) and writing skills (e.g., Warschauer 2009; Watts & Lloyd, 2004). Cobb and Horst’s (2011) study with grade 6 Francophone ESL learners showed that a two-month implementation of an integrated suite of vocabulary training games helped the students gain vocabulary recognition normally achieved in one to two years along with longer oral productions, reduced code switching, and increased speed of lexical access. Kuppens’ (2010) study of Flemish Dutch-speaking 6th graders showed that, in general, long-term exposure to computer games, as well as subtitled English television programs and movies, had a significant positive impact on the students’ incidental English language acquisition. Additionally James Gee argues that these games not only build literacy skills, they also teach students literacy learning strategies and problem-solving skills—new ways to learn and to think about learning (2007). Wolsey and Grisham’s (2007) study with intact grade 8 classes indicated the use of online threaded discussions, an early form of social media, also showed the students’ highly

enhanced engagement in writing, increased critical thinking skills, thorough and sophisticated writing responses to peer postings, and authentic responses to literature.

A longitudinal study on the impact of laptop use on 259 middle school students' achievement found that, after one year, students using laptops showed significantly higher achievement on nearly all measures than their peers with comparable starting achievement levels who did not use laptops (Gulek & Demirtas, 2005). These measures included the California Standards Tests and national norm-referenced tests for the Standardized Testing and Reporting Program on English language arts as well as district writing test scores. The effects lasted until Year 2 and Year 3 of the program (Gulek & Demirtas, 2005). Warschauer's (2006) work resonates with this result, finding that daily access to Internet-connected laptops had the greatest impact on student writing, as the students were able to conduct more background research, receive more feedback, and make more revisions, so they eventually produced higher quality writing. Participating in online blogs and other social media forums was also found to be effective in transforming traditional writing instruction into a constructive and collaborative learning process, fostering students' creativity and personal expression and providing them with unprecedented sense of ownership of their ideas (e.g., García-Sánchez & Rojas-Lizana, 2012; Handsfield, Dean, & Cielocha, 2009; Kervin & Mantel, 2009; Purcell, Buchanan, & Friedrich, 2013). Furthermore, some studies have shown that technology-assisted instruction incorporating research-driven learning principles can provide linguistically diverse middle school students from lower SES families with more opportunities to improve their literacy skills by scaffolding language development, including motivating independent reading (e.g., Warschauer, 2006; Warschauer, Grant, Real, & Rousseau, 2004).

A recent meta-analysis showed that digital text and learning environments had a positive effect on middle school students' reading performance (Moran, Ferdig, Pearson, Wardrop, & Blomeyer, 2008). The researchers indicated that digital scaffolds cater better to individual differences, thus supporting reading comprehension, but they suggest that the research community needs to better understand the impact of digital learning environments. Moran et al. (2008) pointed out:

The evidence permits the conclusion that there is reason to be optimistic about using technology in middle-school literacy programs, but there is even greater reason to encourage the research community to redouble its efforts to investigate and understand the impact of digital learning environments on students in this age range and to broaden the scope of the interventions and outcomes studied. (p. 6)

Although previous research efforts have provided insights into teens' avid interest in and increasing use of new technologies (e.g., Lenhart, 2012; Lenhart, Madden, Macgill, & Smith, 2007; Oksman & Turtiainen, 2004), as well as some effective technology applications and practices for language and literacy education (e.g., Li, 2010; Warschauer et al., 2004), there are gaps in the literature: 1) most studies have reported on teacher-initiated practices, whereas students' perspectives on technology and its use for literacy instruction and learning purposes are rarely examined; 2) research that examines the optimal conditions for the design and implementation of effective literacy practices is lacking, despite the fact that meta-analysis studies of the impact of technology-assisted programs on K-12 students' language and literacy learning achievement have shown only small (though generally positive) effect sizes (e.g.,

Cheung & Slavin, 2011; Kulik, 2003; Soe, Koki, & Chang, 2000); and 3) “there is a significant lack of consensus over what effects digital technology is actually having on young people” (Bennett & Maton, 2010, p. 322). We would assert that this is particularly true for urban youth. Despite relatively rich data about technology use by the general teen population (e.g., Lenhart, 2012; Lenhart, Rainie, & Lewis, 2001), we know nearly nothing about the unique impact of technology use on urban teens, those from low-income families attending schools with limited technological resources. In order to effectively develop literacy interventions to improve urban teens’ literacy skills, we need to gain a better understanding of how they reconcile the uses of technology with their teen culture, and of their views on the applications of technology to literacy instruction and learning.

We were unable to locate research specifically examining adolescents’ perspectives on using technology for literacy instruction and learning. Some studies, however, have addressed teens’ perception about technology uses at school, for example, Lee and Chen’s (2010) study with 9th graders in Taiwan on virtual manipulatives for math and Murchland and Parkyn’s (2011) study on the perceptions of children and teens with physical disabilities in Australia who used assistive technology for school work. In particular, Colley’s (2003) study with two teen student group (11-12 and 15-16 year olds) found age differences in their skills and knowledge, and the purposes for using computers both in and out of school. While the older teens showed more diverse computer activities, including Internet searches and email, and a greater use of computers for coursework, the younger teens indicated that they liked computer games best. Colley suggests that the younger teens related computers more to enjoyment and play than their older counterparts.

Our previous findings suggest that many urban teen students from lower income areas have access to and frequently use computers, mobile phones, and diverse social media; they, however, expressed only moderate levels of interest in using technology applications (e.g., social media), for literacy learning and instruction (Li, Snow, Jiang, & Edwards, 2014; Li, Snow, & White, 2014). To further understand how urban teens perceive their technology uses in relation to their group culture and explore the potential of their technology uses for literacy learning purposes, the present study investigated two research questions:

1. What are urban teen students’ perspectives on their use of technology and on technology-infused group culture?
2. What are their perspectives about the applications of technology for school related learning, particularly for language and literacy instruction?

Methods

To investigate these questions, we conducted focus group interviews with 15 students. Focus group interviews aim at collecting information about “what people really think about an issue or issues in a social context where the participants can hear the views of others and consider their own views accordingly” (Fraenkel, Wallen, & Hyun, 2012, p.475). Focus groups are considered ideal for examining complex issues “within the context of lived experience, and in ways that encourage the participants to engage positively with the process of the research” (Rabiee, 2004, p. 655). Focus groups constitute a comfortable social context where there are no teachers and students can feel at ease to express their critical thoughts and true feelings (Krueger & Casey, 2000). Furthermore, in the group setting skilled moderators/interviewers can draw out differing

perspectives on the topic and probe for more details, thus gaining deeper insights than in individual interviews (Fraenkel, Wallen, & Hyun, 2012; Krueger, 1994).

Context for Research

Prior to this study, our research team had established a strong rapport with the middle school where the study was being conducted, in large part due to four years of collaboration on the implementation of a data-driven academic language instructional intervention, Word Generation (WG). The primary goal of the program was to integrate language and literacy instruction in content area classes. The program provided students in grades 6-8 with daily 20 minutes of instruction on frequently occurring academic words, through discussion of a dilemma-based weekly topic, in each of four content area classrooms: English Language Arts (ELA), Math, Science, and Social Studies, culminating with a writing task at the end of the week. Each topic was introduced in ELA through a brief text, and expanded with learning activities. Each subject area teacher taught the program one day a week in their content area, using the same academic words which were embedded in a content specific activity. The activities were designed to give teachers an opportunity to help students explore issues and solve problems connected to their specific content area or subject. So students learned the target academic vocabulary along with other literacy skills across the curriculum (Strategic Education Research Partnership, 2014). Preliminary results showed that the WG instruction was effective in promoting students' learning of academic words that are crucial to understanding academic texts (Snow, Lawrence, & White, 2009). Thus, one goal of the present study was to explore the feasibility of providing WG instruction using technology for urban middle school students who often lack adequate literacy support in their home environments. However, during the focus group interviews we posed general questions to elicit students' perspectives on their technology use and their interest in using technology for literacy learning purposes. We argue that an optimal choice of technology for literacy instruction and learning reflects not only the capacity of a particular technology application or device to scaffold effective literacy instruction, but also students' preferences for how to use technology in ways that fit with their group culture.

Participants

We conducted three focus groups in an urban public school in Boston, MA. This study was part of a larger study that involved 531 students in the school to investigate urban middle school students' access to, use of, and purposes for using technology devices and applications using a survey (Li, Snow, & White, 2014). The school is located in a lower-income, ethnically diverse neighborhood; 75.6% of attending students received free lunch while 9.8% received reduced-price lunch². Thirty-four percent of the students spoke one of 18 first languages other than English at home; these included: Spanish, French, Vietnamese, Mandarin, Cantonese, Portuguese, German, Arabic, Hindi, Swahili, Yoruba, Serbian, Greek, Somali, Cape Verdean Creole, Haitian Kreyol, Nigerian Igbo, and Jamaican Patwa. About twenty-two percent of the

² The federal government provided National School Lunch Program operates in public and non-profit private schools and residential child care institutions and aims to help students from lower income families.

students were classified as English language learners (ELLs³) with limited English proficiency, and 21.2% were born outside the U.S. The survey results have shown that majority of the students at the school had access to a cellphone (91.23%), desktop (84.2%) and laptop (76.12%) computers, and one third of them had the access to a tablet computer (34.64%), and many of them also owned a cellphone (58%, including 23.73% owned smartphones), mp3 player (45.95%), iPod (36.35%) and game console (32.31%) (Li, et. al. 2014).

With help from the teachers in English language arts classes, we used a stratified randomization procedure to select five students from one intact class at each grade, from among the 531 students whose parents had consented to their participating in the study. A total of 15 students in grades 6, 7 and 8 actively participated in the focus groups. There were three male and two female students (aged 11-12) in grade 6, two male and three female students (aged 12-13) in grade 7, and three male and two female students (aged 13-14) in grade 8. There were three English-only and two ELL students in both 6th and 7th grade groups, and two English only and three ELL students in the 8th grade group. Students were informed that they had the right to refuse to answer any of the questions during the focus group interview and they also had the right to read and correct the final transcripts of the interviews.

Procedure and Data Analysis

We selected each 5-person focus group from an intact class, to avoid placing the students, in particular the ELLs, in an unfamiliar environment. The three focus groups were interviewed for a total of 4.5 hours; sessions were conducted during school hours, shortly after the 15 student participants had completed a six-page self-reported survey along with their peers. This survey collected information about 1) their access to desktop, laptop and tablet computers, and mobile phones, 2) their ownership of mp3 players, iPods, touch pads, mobile phones and smartphones, 3) whether they had accounts with any of 10 communication and social media platforms, e.g., YouTube, Facebook, Skype, Wiki, and 4) their interest in using Facebook, Twitter, YouTube, and text messaging for language and literacy learning purposes (Li, Snow, & White, 2014). Thus the student participants in the focus groups were aware of the topic.

After many discussions with Word Generation's school-based facilitator and leader teachers, our eight-person research team developed open-ended questions to guide the focus group interviews. Drafts of these questions were communicated to the facilitator and teachers involved with the project to ensure that they were relevant to the students' experiences and to the overall school context. Revisions were made based on feedback from members of the research team as well as researchers and teachers working closely with urban teen students. The following five questions were used to guide the focus group interviews:

1. What does technology mean to you?
2. What kinds of technology do you use, and what do you use it for?
3. Do you use social media sites such as Facebook, YouTube, Twitter, etc., and what for?

³ According to the Massachusetts Department of Elementary and Secondary Education, an ELL student is defined by as "a student whose first language is a language other than English and who is unable to perform ordinary classroom work in English." See <http://www.doe.mass.edu/Assess/> for details.

4. Do you believe that students could use technology to learn language and literacy skills, and how?
5. Do you believe that teachers could use technology to teach language and literacy skills, and how?

Each focus group session was audio-recorded. All of the audio records were transcribed verbatim. Pseudonyms were used for all student participants. To answer the research questions, in light of the grounded theory (Glaser & Strauss, 1967), we read through all transcripts to code and tally the occurrences of students' idea units, while remaining conceptually open for the emergence of ideas from the data (Corbin & Strauss, 1998). Thematic analysis was applied to the coded idea units to bring "together components or fragments of ideas or experiences, which often are meaningless when viewed alone" (Leininger, 1985, p. 60). We analysed coherence of students' ideas, examining "how different ideas or components fit together in a meaningful way when linked together" (Leininger, 1985, p. 60). These identifiable themes were cataloguing related, stable patterns into sub-themes/idea units. Themes that emerged from student participants' accounts form a comprehensive picture of their collective experience (Taylor & Bogdan, 1984) derived from their interactions with technology devices and applications, including social media. Please see Appendix A for the results of coding and thematic analysis, including 1) theme categories, 2) sub-themes/idea units, 3) numbers of idea units, and 4) percentages of idea units among overall idea units coded and 5) samples of the utterances that were coded with each idea category.

These results were also analyzed in light of the survey findings from the same cohort of students, reported previously (Li, Snow & White, 2014; Li, Snow, Jiang, & Edwards, 2014). These two articles focused on quantitative data, profiling the students' use of new technology devices and applications, and their interest in using technology for literacy instruction, as well as the differences in technology use and interest between students who spoke English as a native versus non-native language. The present study examines factors underlying the profiles of students' technology use, with the goal of deepening our understanding of students' perspectives on technology practice and its application for literacy learning and instruction.

Findings

Urban Adolescents and Technology-Oriented Teen Culture

The analysis of transcripts of the focus group interviews indicated that student participants equated technology to the computer, cellphone and social media. They were strongly oriented to socialize with friends and entertain themselves using these new technologies. When asked "what does technology mean to you, and why?", and "what is your favorite technology?" Gina and Kyle, two grade 8 students said: "Technology is a great way to connect friends"; "Cell phone is my favourite technology, (because)⁴ it's a good way to communicate with family and friends...we can do a lot of things using cell phones, like listening to the music". When asked about their main purposes for using their favourite technology, students' answers included the

4 (.....) indicates the missing utterances added by the transcriber; the symbol "--" indicates utterance being interrupted; and [.....] indicated unclear utterance.

Internet, YouTube, Facebook, computer games, texting and twitter. In addition to playing computer games for entertainment, games also have become a major means for teens to socialize with others, as described by 7th graders in the following extract:

- Interviewer: Do you have to sit in the same room to play with someone?
 Marie: Sometimes. You can also play with people from other countries.
 Jason: You get to meet other people.
 Marie: Oh, a good way to meet other people, and communicate with them.
 Interviewer: Do you always play with the same people online?
 Elena: No, you don't.
 Jason: You can play with different people.
 Interviewer: Do you get to pick who you like to play online?
 Jason: You can. You can add a lot of friends, the guys (who) you'd like to talk to each other a lot.
 Interviewer: Oh, what do you talk about when you play games?
 Jason: Sometimes you talk about, like, where you are, who you are, and how they are different from you.

In this script, Jason and Marie emphasized that the essential interest in playing computer games—a popular teen entertainment—was socializing: meeting different people online, adding a lot of friends and learning about how others' lives were different from their own.

Teens' patterns of using technology for social purposes meant that even those with more expensive and sophisticated devices were willing to abandon the advantages of those devices in order to conform to widely shared practices. For example, most of the teens, even those who had smart phones with data plans, were texting to their peers instead of writing email or speaking on the phone. Of course, conforming to their peers' uses also symbolizes insider status; in other words, this signals a sense of acceptance and belonging to their peer group rather than exclusion and alienation from peers. It is critical for teens to validate what they do using technology with their peers as shown in the following conversation with two 6th graders.

- Interviewer: What do you use laptops for?
 Tony: Video games.
 Erica: I go on Facebook, twitter.
 Ashley: Facebook is not fun anymore.
 Interviewer: Why is that?
 Ashley: You know... All you can basically do is chatting with people, play(ing) games or just upload(ing) photos...
 Ernesto: You could do video chats that everyone is going to use.
 Ashley: That is what I am talking about. It is just chats.
 Ernesto: But everyone is using it... That's where everybody meets.

While Ashley would like to try different social media platforms than Facebook, Ernesto repeatedly emphasized the dominant teen trend of interaction through Facebook. The social inclusiveness of teens' technology use is essential for defining their cohesive culture and affirming their identity, which is also highly exclusive of other groups.

Student comments about technology-enabled communication reflected their desire to create safe spaces for their self-expression and growth throughout the adolescent years. Teens connect virtually with other teens they may never meet, but not with adults they know well. All students in the study felt uneasy interacting with their teachers on Facebook, as three 8th graders elaborated below.

- Interviewer: How do you feel about communicating with your teachers on Facebook?
- (Students laughing)
- Anthony: That's kind of awkward.
- Interviewer: Awkward? Ok, why?
- Anthony: Because like you don't really see... To me, I just see teachers as teachers. I don't really feel like they have their own personal life or stuff. So it's kind of weird to have them on Facebook and see that they actually do something other than teaching.
- Gina: They have friends.
- Anthony: Oh, yeah, they have friends.
- Kyle: Or if you post something on status like a whole bunch of curse words or anything, and they go on Facebook, they'll see it!

During the interview, Anthony, Gina and Kyle firmly believed that it would be awkward to connect their teachers in Facebook—a primary socializing space for their peers—where they can express themselves freely and in the ways their teacher might not approve of. When asked if Facebook can be used for learning, to avoid involving their teachers on Facebook, 6th graders proposed to create a different social media platform to communicate with their teachers, as articulated in the exchange below.

- Interviewer: Have you ever thought about using Facebook for learning?
- Ernesto: I thought it would not be possible.
- Erica: It's not possible.
- Ernesto: Facebook is too much of a social thing.
- Tran: Add my teacher? Oh my god, that's embarrassing.
- Interviewer: So you don't want to add your teacher?
- All 6th graders: No.
- Interviewer: How about having two (Facebook) accounts?
- Ashley: Yeah, so I'll have one secret account and nobody knows it, and all I have is teachers. The other one is for everybody else.
- Ernesto: Yeah, I could do that.
- Tony: But that would be kind of weird, awkward.
- Ernesto: Because if you video chat with your teachers--
- Erica: So weird.
- Tran: I think people should invent a new website for that like--
- Ernesto: You can work, and you can socialize too.
- Tran: Basically, it's like a virtual classroom.

There are some minor variations in teens' perceptions regarding Facebook as an exclusively social space. While the 6th graders, Ashley and Ernesto, were willing to consider using a separate

Facebook account for learning and to affiliate with their teachers, Tong and Ernesto and Tran didn't see any possibility of using Facebook for school-related purposes, although they all were keen to have integrated technology—using a different website (web conference) as a virtual classroom—for instruction and learning. In the same vein, 8th graders who were more knowledgeable about social media websites made the specific suggestion of using a site called engrade.com to facilitate learning and instruction.

- Gina: There is a teacher website; it looks just like Facebook. It is blue (background), I think it's called Engrade.
- Kyle: I have seen it last year.
- Gina: Yeah. Some kids can have engrades... It's engrade.com. It is just like Facebook.
- Anthony: So you can check your grade; you could communicate with your teacher, like what is homework for tonight or if you are having a problem. That's an easy way to communicate without having to go on Facebook.
- Interviewer: Is it like Facebook?
- Kyle: Just like Facebook.
- Michael: It looks like Facebook, but it's not really.....you just kind of check your grade, communicate with your teachers, with others... your classmates about homework advice.
- Interviewer: Do you guys like using it?
- Anthony: I don't really use it, but I think it's a good idea when you need help; when you need to talk to your teachers.

Adolescents' Pragmatic Approach to Technology Use

In the present study, 8th graders showed a pragmatic approach to technology use. They focused more on enabling features and less on brand names of technology devices than their peers in grades 6 and 7. When asked what they think of when it comes to technology, Ernesto, a 6th grader said “the beginning of the future”, and many of his peers mentioned the popular Apple products. In contrast, most 8th graders mentioned “laptops and cell phones.” Anthony said “the computer is the most important technology in my life;” and Gina said “technology is a great way to connect friends.” For 8th graders, connectivity and affordances that support communication with their friends, and to a certain degree their school work, were their major concerns.

Eighth graders also appeared to be more resourceful about social media than their younger counterparts. Some of them accessed social media primarily on their smart phone rather than PCs. They not only used popular sites, such as Facebook and YouTube, but also other less well known but more sophisticated sites that suited their needs. When asked which one would be their favorite social media site, many 8th graders said Tumblr and IMVU in addition to YouTube.

- Anthony: I use Tumblr every day and I have it on my phone. It's like a blogging site...it's kind of like twitter and blogging combined. So you can post a message and you can blog out pictures... It sounds like Facebook, but it looks totally different once you see the site. It's more interesting than Facebook...

Tumblr is a blog-like social medium that focuses on the content and topic of members' interests, but not on their personal life. Content includes high quality video clips, movies, music, photos, paintings and writings. The 8th graders believed Tumblr was a good site because it was less time-demanding and it could help them develop their projects if used with discretion. Given Yahoo's investment of 1.1 billion dollars in Tumblr, and an observed upward trend of teen use of the platform, Tumblr has been predicted to soon become teens' favorite choice of social media (DeSilver, 2013). IMVU is a social entertainment website where members can assume identities as 3D avatars to meet people and play games, and they are also encouraged to participate in content creation using its software create mode. Grade 8 teens were more attracted by the creative features of social media that aligned with their own interests and needs than some of their younger counterparts, and did not focus so exclusively on social interaction features. However none of the students indicated they used these social media sites for learning purposes rather than entertainment, though they all expressed keen interest in using technology at school, with the exception of Facebook.

Attitudes towards the Integration of Technology for Literacy Instruction and Learning

Students were fairly observant about their teachers' technology practice during instruction, and they accurately recalled what teachers in different subjects had done with technology in class, as well as what type of technology devices, such as personal computers, the teachers used. Their recollection of the technology use at the school reflects a gap in the technology adoption among teachers in different content areas, in particularly between math, science and ELA classrooms. This may have resulted from the priority of providing technology to facilitate math and science instruction at the school. Students across grades 6, 7 and 8 all reported that there were SmartBoards installed in either math or science classrooms, but none in ELA classrooms. The following interview extract provides us a glimpse of the situation.

- | | |
|--------------|---|
| Interviewer: | Do you have the Internet (access) at school? |
| David: | Sometimes, it depends. |
| Interviewer: | Where, and when do you have (the Internet) access? |
| Jason: | Usually when in science...when we are researching for a project, or doing First In Math ⁵ . Sometimes we have to compete in First In Math. |
| David: | Doing First In Math. |
| Elena: | And sometimes we have computers in math classes. |
| Marie: | Often when we are doing First In Math... |
| Interviewer: | How about language arts? |
| Jason: | We often have it (computers and Internet access) for maths and science. |
| Elena: | Yes. |

⁵ First In Math (FIM) is an online program developed by Suntex International Inc. Easton, PA, U.S. It aims at creating a progression-based, interactive environment to facilitate Grade 1-12 students' learning of comprehensive mathematics content using an engaging format, such as math games (Suntext International Inc., 2014). Detailed information can be found via its website at <http://explore.firstinmath.com/about-fim?cc=us>

During the focus groups interviews, none of the three groups across grades 6, 7, and 8 voluntarily reported technology-assisted instruction was implemented in the ELA classrooms. For example, even when the interviewers explicitly asked 6th graders about technology use in the ELA instruction, students overlooked the question, and continued to confirm technology use for math and science classes. This situation was further confirmed in the transcript below:

- Interviewer: When you have access, do you have the computer in your classroom?
- Jason: We have computers in the lab. But sometimes, they (teachers) have the tiny computers and they can bring (computers) to different classrooms.
- Interviewer: Oh.
- Elena: Yeah.
- David: Tablets.
- Jason: Yeah.
- Interviewer: So math and science teachers bring computers, tablets to the classroom?
- Elena: Yeah.

When the interviewer again raised the question about the technology use in the ELA classroom, the students clearly said the technology was not used in the classroom except that an iPad and laptop computer were used by their ELA teacher to keep record of their grades.

- Interviewer: OK, I see, that your science and math teacher use some technology, right? How about your language arts teacher?
- David: They don't use.
- Elena: She doesn't.
- Interviewer: Doesn't your language teacher use technology?
- Jason: No.
- Marie: Ms. Smith sometimes uses an iPad, and laptop computer.
- Interviewer: Oh?
- Elena: She uses them for keeping our grades.
- David: Yeah.

Regardless of the situation, the students all eagerly contributed ideas for using technology in ELA classrooms, when asked about using technology for literacy instruction and learning. However, though only one to two years older, the 8th graders demonstrated a more active attitude and were more informed about using technology for learning than 6th and 7th graders, most of whom said they used technology to “print and type stuff,” “take notes,” “do my homework (using Word),” “look up words for ELA,” and “Google it (words).” See the transcript from the 8th graders below:

- Kyle: If I'm doing homework; I'm struggling on something, I will look it up on YouTube. (If) I see someone post it and then I will know how to do it.
- Interviewer: Ok, how about you guys?
- Jennifer & Gina: Yeah.

Jennifer: Or use Google.
 Anthony: Yeah, Google.
 Kyle: Google helps everyone. You can do anything using Google.
 Google saves lives (students laughing).

It is clear that the 8th graders, particularly Kyle, regularly used Google to locate information and seek help for their school work, and they believed the resource was critically important for them (“saves lives”). Furthermore, 8th graders were found to naturally integrate socializing and learning in their peer social media space, Facebook, as demonstrated in the script below.

Interviewer: Do you also discuss homework questions with friends on Facebook?
 Jennifer: Yeah.
 Anthony: If you are working on the wrong homework and you want to clarify (it).
 Kyle: Sometimes, I actually get answers (from classmates on Facebook).
 Interviewer: Ok, like what are the answers to these questions?
 Kyle: Here, we have the [assignment] called Word Generation, so a lot of people forget to bring their books home. Everyone is like (asking their peers about the question on Facebook): “What is the (Word Generation) topic question?”
 Interviewer: What do you mean by topic question?
 Anthony: What is the question for the week? I think this week is ... “Is genetic testing necessary?”
 Interviewer: Oh, the big controversial questions... So you use Facebook to ask people what that (Word Generation) question is?
 Gina: (And) their opinions, too.

Though the teens indicated they didn’t want to involve the adults, including their teachers, on Facebook, the 8th graders discussed homework with their peers on the platform, including clarifying and discussing the debate questions from the Word Generation program being implemented in their school.

Most importantly, 8th graders’ ideas to integrate technology into the classroom were pragmatic and critical. During the focus group interviews, 8th graders discussed several important issues related to the application of technology, especially using laptops in class. They were able to make feasible recommendations to the school, given their learning needs, and the challenges the school administration faces.

Gina: Probably we can keep it (the laptop) in our binders. Like the iPad, we can just carry it in our binders--
 Anthony: Then we have to change the system that we use to carry stuff, because binders, if you try to keep a laptop, do not really fit the size, and the shape.
 Kyle: One thing they (the school) can do is...if they have laptops in classes, and they can give you the memory thing for the

- laptops...you can have all your stuff on that memory. Then you can take it wherever the classes are.
- Interviewer: Like a USB drive?
- Kyle: Yeah.
- Gina: It is good to have like 20 (of them)... It depends on how many classes, how you arrange students, or how many computers or laptops in the classroom. But that is a lot of money for the school, we can have a fundraiser. Over a couple of years, they can probably make this happen.
- Interviewer: Ok, so instead of students each bringing them their own USB drive, the school provides--
- Gina: Yes.
- Anthony: Some kids don't really have that, so it would be a good idea to raise money; so each kid has the opportunity to use the laptop in class. This will make it easier.
- Kyle: Really we don't need it in every class.

As the 8th graders thought about the pragmatic approach of “bringing your own device” (BYOD) to the school, they were able to critically take into account the practical issues from the school administrations’ perspective and their peers’ SES backgrounds, such as how to keep and carry laptop computers and purchasing technological devices. They actively contributed to a feasible solution—purchasing USB drives through fundraising and using them in the lab—, given the school’s tight budget and their peers’ economic resources. One of the 8th graders, Gina, further critically raised an equity issue that can be caused by the BYOD initiative as follows.

- Gina: I think if you would like to bring your own technology, you will get a range of that. People will separate you from poor kids and rich kids. That is something like the clothes. That's why next year we will have uniforms. Because right now if you wear fake Polo, you are poor; if you get real Polo, you must be rich.
- Gina: Or if you are the poor kid, you have the oldest iPod in the world, --
- Interviewer: Ok. I could see that might be a problem --.
- Gina: Differences.

Not only did 8th graders address major practical and critical issues that the school and students would encounter in the integration of technology into class, they also proposed potential solutions by taking the school’s perspective and considering the consequences for students from different income levels. Their sense of agency and critical thinking skills were also reflected in their search for learning autonomy using technology. They further discussed BYOD to classrooms, including the blocking of WIFI, and mobile phone use at the school.

- Anthony: I think people would feel more comfortable if the school let us bring in our own technology and know that they won't get to (be) taken away... We don't have a study hall here like other schools. It would be good if we would be able to use our computers and stuff other than being in the class with 30 other kids, not being able to focus.

- Interviewer: What are you going to do with the laptops in class?
- Gina: If you have a question sometimes...; if it's a big class that the teacher is with other students, and you need help with questions, you can just look it up... We could do classroom assignments over iPads, iPhones, or laptops... If teachers just put questions on the board, we can answer these questions using our technologies ...because they can't hold our hands in every class.

The topic of BYOD was often raised and the feasibility of its implementation was critically discussed during the focus group interview with the 8th graders. For example in the above script, Anthony and his classmate not only presented assisting students and complementing teacher-driven instruction in large classes as advantages of BYOD, but he and his peers also carefully examined the critical subsequent issue of implementing BYOD—Internet access.

- Anthony: Even if you are able to [bring your computer], because we tap into the school Wi-Fi, it just blocks everything...any other sites.
- Kyle: Maybe they would like to open, like, a new Wi-Fi--
- Anthony: Well, now the 4G phones have hotspots, so some people might use their phones to--.
- Gina: What we can do is that we can bring some technologies into the school, which don't need the Internet. Like for readings, you can bring Kindle.
- Kyle: Yeah, you could bring your tablet.
- Interviewer: So you are allowed to bring a tablet?
- Anthony: Yeah, like a iPad, or a Kindle
- Kyle: Yeah, Nook.....
- Interviewer: Ok... it would be good to bring your own technologies, like having your phones, iPads, laptops in class?
- Anthony: Well, I don't really think phones are necessary. Just bringing the tablets and laptops would be a good idea... because you can use your phone anytime when you get out of school.
- Kyle: If you have a phone now, most likely you just text someone instead of actually doing work.

This conversation showed that the 8th graders could pragmatically and critically evaluate diverse technological and social factors when adopting technology for use in school. When realizing that accessing the Internet via the school Wi-Fi was impossible, they resourcefully suggested to access the Internet using hotspots via their own smartphones. Finally Gina and her peers proposed bringing devices which didn't require the Internet for learning, and critiqued the suggestion of cellphones on the grounds that they might distract students' attention at school.

Summary of Findings

This study produced some noteworthy results. First urban teens, mostly from lower income homes, were well informed about new technologies and seem to participate in the same technology-infused teen culture as their counterparts in the general teen population (Lenhart, 2012; Lenhart, et al., 2010; Li, Snow, & White, 2014). Second, data derived from focus group

interviews are consistent with the results of the survey conducted among 531 students at the same school, which indicate that these teens' technology use was mainly oriented to interest and fun. They prioritized using social media and technology devices for socializing with peers and for entertainment. Their technology-enabled communication was highly exclusive of others, in particular adults. Third, these students were interested in using technology to improve their literacy skills, and had some thoughtful suggestions for doing so, but few of them had voluntarily or independently integrated technology into learning. In addition, they appeared wary about letting technology-based educational interventions invade their personal social networking space.

Finally there were distinct age differences among these 12-14-year-old teens' perspectives on their technology use and the potential for using technology to support their learning of literacy skills. This echoes the survey results (Li, Snow, & White, 2014; Li et al., 2014), and provides us more in-depth understanding of the characteristics of these group differences and factors contributing to them. Compared to 6th and 7th graders, 8th graders in the focus groups were more critical consumers, and had a pragmatic approach to technology use. During the focus group interviews, they offered more sophisticated ideas about technology applications to learning—taking the school's perspective, considering the affordability of integrating technologies for students from different income levels, and demonstrating agency and critical thinking skills in their search for learning autonomy using technology—than 6th and 7th graders, whose interests primarily included using computers to look for word definitions and other information online, taking notes, and printing out information. These differences might result from the 8th graders' increased access to technology applications and devices at the school and home; teachers and parents might facilitate the use of technology to support instruction, promote learning activities, and facilitate completing school assignments for these students who would imminently enter high school. The richer technology experiences and greater cognitive capacities of the older students might also help explain their broader perspectives on technology application.

Discussion

This study offers an in-depth look at the complexity of teens' behaviors when using technology, in particular the dynamics of the technology-oriented teen culture, which shed light on the results of the previous survey study with these same students. These findings revealed that teens, including many language minority students with diverse literacy skills, are true believers in technology and play an active role in contributing to the mainstream teen culture fueled with technology influence. This is consistent with the findings of Batat's (2008) ethnographic study with teens aged 11–15 in France, which showed that digital products were part of teen sub-culture, and that teens are “active participants and producers of their cultural consumption processes” (p. 374). Their peers' behaviour plays an important role in developing teens' technology consumption skills. Teens in our present study shared the perspective of the British teens and young adults with diverse literacy and language skills (aged 14-24) in Hynan, Murray and Goldbart's (2014) study. While the former said the primary goal to use social media is to connect with peers, the latter reported that their use of social media enriched friendships.

The results showed these urban American teens from lower income families demonstrated patterns of technology use similar to those of teens from the general population (e.g., Lenhart et al., 2010) and higher income families, despite their relatively limited access to technological devices. They were knowledgeable and eager to exchange information about advances in

technology devices and applications, and spent much of their time interacting with friends via social media such as YouTube, Facebook and Tumblr. For example, three 8th graders out of 15 participants from lower SES backgrounds talked about using Tumblr, while based on the PIALP's recent report of a general population sample, 5% of teen social media users in U.S. reported using Tumblr in 2012 (DeSilver, 2013). Tumblr is used at both ends of the income scale; 8% of people with household incomes above \$75,000 and 6% of people with incomes below \$30,000 report using it (DeSilver, 2013). Leu and colleagues suggest that SES predicts new literacies skills; children from lower SES families tend to score lower on online reading comprehension achievement, an indicator of the new literacies skills. So, although SES may not be a barrier to technology access, it may be a critical predictor of how well teens can access and use the vast array of information technology makes available (Leu et al., 2014).

These findings are also consistent with recent research indicating that adolescents have adopted social media and digital technology devices at a much faster pace than the general population (e.g., NCES, 2005; Lenhart, et al., 2010; Zickuhr, 2010). They express their values and concerns virtually, and represent themselves in unprecedentedly powerful ways to reach a broad peer audience, as well as to strengthen their existing personal connections. They control the expression of not only their real life stories but also their aspirational identity among their “friends” (Facebook), “connections” (LinkedIn) and “followers” (Twitters). Instead of being confined by traditional media portraits of “teenage lives, and fantasies of what teens' lives might be like” (Tell, 1999, para. 12), such as found in movies, radios and newspapers, teens take an active role in shaping their images and identities through new technologies. Integrating technology into teaching and learning literacy offers great promise if our instructional designs are congruent with the teen culture of technology use and interest, respecting the existence of their exclusive social media spaces where they express their own voices and define their identities within their communities.

Other factors also need to be considered in technology-assisted instructional design. One salient finding of the present study was age differences in approaching technology use among urban teens. Although the student participants spanned only three years, 8th graders' approach to technology use appeared to be more practical, and they also demonstrated a stronger initiative to integrate technology into their literacy learning and developed more critical thinking skills against technology commercialism than 6th and 7th graders. These differences may result from the fact that 8th graders demonstrated more advanced knowledge about technology, and they reported more exposure and access to technology at home and school for their increased social needs and school assignments. The findings of our survey with 531 students at the same school showed that 8th graders had significantly more access, reported more frequent use, and higher levels of ownership of technology devices and social media accounts than their younger peers (Li, Snow, & White, 2014). For example, the results of one-way ANOVA and post hoc tests for grade differences indicated that 8th graders used laptop computers significantly more frequently than 6th graders at home, and they also used mobile phones significantly more frequently than 6th graders and 7th graders at home. Also there were significantly more 8th graders than 7th graders with email, instant message, Facebook, Flickr, Skype and Twitter accounts, and significantly more 8th graders than 6th graders had email, instant message, Facebook, and Skype accounts (Li, Snow, & White, 2014).

These findings from both the focus group and survey studies confirm the finding of the age differences in technology use from previous studies. For example, 12- to 15-year-olds in Livingstone and Helsper's study (2007), whose ages were comparable to the 8th graders in present study, used the Internet more frequently than children aged 9-11. These results also appear to support the finding of variation in technology user types indicated by Green and Hannon (2007). While all student participants could be identified as everyday communicators and information gatherers (i.e., using Facebook, YouTube, Google), we observed the characteristics of creative producers and digital pioneers almost exclusively with 8th graders, who demonstrated self-determination to learn new technology skills, express themselves through creative productions, and reach out to a broader audience. For example, two 8th graders reported having learned computer code to design websites through HTML Tutorials (<http://www.html.com/>), and they also used Tumblr for the project and created virtual products for games in IMVU. Such activities require an adept mastery of technology and creativity, rather than just the searching for information and socializing mentioned by most grade 6th and 7th students during the focus group interview.

Furthermore, 8th graders in the study differentiated themselves from their peers by their interest in actively and critically contributing ideas to design their own learning experiences (also see Green & Hannon, 2007). They made thoughtful suggestions during the focus group interview for how the school might integrate technology into classroom literacy instruction (e.g., bringing Kindles, Nooks to the class to improve reading skills when the Internet is not accessible), given the constraints of the school budget, administrative challenges (e.g. shortage of staff to monitor student use of unlocked Internet), and affordability (e.g., suggesting a fundraising event for the school to purchase USB drives for students). The 8th graders had more characteristics of autonomous learners and critical users, rather than being passive adopters of new technology. For example, Gina and her peers were concerned about how technology can help them to achieve their goals, rather than relying on technology to give them directions and determine their learning behaviours. While we realize that technology represents an important component of teen identity and culture, we should address the significant differences in behaviours and preferences between skilled technology users and others (Dede, 2005; Oblinger & Oblinger, 2005).

Conclusions and Pedagogical Implication

It should be noted that this study was conducted with a small sample of students at one school. Additionally due to time constraints and ethics concerns, we were unable to collect information from the students about matters such as their access to technology devices and services and their family backgrounds, including parents' income levels and occupations. Precautions should be taken in viewing the results. Future research will be needed to substantiate the results by investigating more detailed and explicit questions about student perceptions of what counts as literacy, how literacy is taught at school, and how technology is used pedagogically to support the teaching and learning of literacy. Also our findings about students' perceptions of their technology use and its potential for literacy learning naturally focused primarily on social media, although we also asked students broad questions about technology, and did not intentionally focus on discussion of their use of social media. Future studies are needed to investigate students' perspectives on their use of other technology applications and devices and their potential to support literacy learning. The present findings, however, contribute to deepening our understanding of the role of technology in the urban teen culture, and offer insights for the

development of innovative literacy instruction, tapping into teens' interest in and knowledge of technology.

It is worth noting that though these urban teen students expressed interest in using technology for literacy learning, they collectively regarded technology use as primarily for leisure and sociability, consistent with the results of Sánchez-Navarro and Aranda's (2012) study. They didn't appear to be voluntarily and independently engaged in learning using technology devices or social media, except for a couple examples of using Facebook to communicate about the WG assignment. There is an urgent need to understand urban teens' identity and perspectives if we hope to tap into their technology practices in ways that conform to their group culture. Only when we obtain insights into urban teens' specific interests and patterns of technology use can we optimize the integration of technology into literacy instruction.

The present findings clearly demonstrated age differences in teens' perspectives on technology and their actual technology use; thus when designing and implementing technology-integrated literacy interventions, an important principle is to differentiate instructional strategies for students in different age groups based on their technological competencies and the levels of learning task sophistication. From the present findings, we believe that, at least during the early implementation of a technology-related intervention, it may be more beneficial to provide younger teens more structured or semi-structured literacy activities with explicit instructions, while promoting more autonomous literacy learning activities among older teens. For example, as many 6th graders expressed strong interest in YouTube during the focus group interview and the survey (Li, Snow, & White, 2014), themed videocasts could be integrated into classes to facilitate literacy instruction for younger teens. For older teens, it might be more effective to engage them in debate on a topic of their interest, integrating podcasts, narrated PowerPoint, and motion pictures, given that they had experience working independently on school projects using multimodal information and reported a broader interest in diverse social media platforms, such as Tumblr (Li, Snow, & White, 2014; Li, Snow, Jiang, & Edwards, 2014). Students' social networking interest can be transferred to collaborative online learning experience on social media platforms popular among teen students, such as twitter and blogs. Educational media suggested by the 8th graders (e.g., Edmodo, Engrade, and Edublogs) can also be used for group literacy learning activities which will protect students' privacy, as well as avoid interfering with students' social interaction space.

Before developing literacy instruction for teens, practical questions for teachers include the feasibility of using certain technology applications and devices for the instruction, and the fidelity of its implementation. These questions are closely associated with teen students' perspectives on and daily practice of technology use. Teachers can profile and evaluate students' preferences, access to and knowledge of technologies with surveys, including questions about ownership of and access to technology devices, the frequency and purpose of technology use, and technical specifications of technology applications (e.g., Li, Snow, & White, 2014). Tutorials can be provided to students based on their preferences, levels of technology use and skills needed for the online literacy activities. With the enhanced technical competencies and the awareness of students' perspectives on and access to technology, teachers can encourage students and help organize their literacy learning activities at home, e.g., integrating class blogs, Twitter, or wikis into students' independent or collaborative online reading, discussion and writing. In summary, to develop effective literacy instruction by taking into account teens'

perceptions, promote their learning achievement and honor their ownership of learning outcomes (e.g., book club blogs and project websites) with a broader audience (e.g., parents and students in sister classes and schools) using technology (e.g., inquiry-based group projects supported by social media) is an effective way to enhance students' literacy skills, as well as literacy learning culture in school and home environments.

Many endeavors to integrate technology into instructional strategies have been designed to improve teens' academic achievement; however, as noted above a growing body of research has generated mixed results from using technology for language and literacy instruction and learning (e.g., Goldenberg, Russell, & Cook, 2002). Given the lack of technology facilities in most public school systems, bring your own devices (BYOD) models will be needed to make technology-assisted literacy instruction and learning at school possible. The potential for using technology to improve students' literacy skills can only be realized through developing well-designed interventions to enhance their intrinsic learning motivation, and more importantly, through developing an in-depth understanding of teen group culture and the complexity of their behaviors when adopting technology.

Acknowledgements:

The project was sponsored by a Canada-U.S. Fulbright Research Scholarship awarded to the first author. The second and third authors were supported during the preparation of this manuscript by the Institute of Education Sciences, U.S. Department of Education, through Grants R305A090555 and R305F100026. The opinions expressed are those of the authors and do not represent views of the Institutes, the U.S. Department of Education and Fulbright Canada. We would like to thank the two anonymous reviewers for their valuable suggestions for revisio, and Dr. Barbara Kerr for her editorial suggestions for the draft of the manuscript. We are indebted to the students for their active participation in the study. A special thanks goes to our research assistants, Peizhao Li, Yan Wang, Nicholas Edwards and Jingjing Jiang, for their help with the project.

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Appendix A: Coding and Thematic Analysis

Table 1

Results of coding and thematic analysis of focus group interviews (N = 15)

Themes Sub-Themes/Idea Units	Number of Idea Units	Idea Units (%)	Samples
Technology oriented teen culture			
Significance and frequency of social media use	10	4.5%	“What I like about YouTube is that you can watch videos of course.” (7 th graders) “I use Facebook every day.” (8 th graders)
Significance and frequency of mobile phone use	8	3.6%	“I use texting a lot... texting is much easier than email.” (7 th grader) “I use Tumblr every day and I have it on my phone.” (8 th graders)
Significance and frequency of playing computer games	28	12.6%	What technology you use every day? Computer games... video games.” (two 7 th graders)
Technology for peer connection	9	4.1%	“Technology is a great way to connect friends.” (8 th grader)
Social media for peer connection	12	5.4%	“I use Facebook to talk to my friends.” (8 th graders)
Mobile phone for peer connection	7	3.2%	“Cell phone is my favourite technology, (because) it's a good way to communicate with family and friends.” (8 th grader)
Computer game for peer connection and entertainment	5	2.3%	“You can also play with people from other countries... You get to meet other people... (play games) Oh, a good way to meet other people, and communicate with them.” (two 7 th graders)
Listening to music via social media or cellphone	8	3.6%	“...we can do a lot of things using cell phones, like listening to the music.” (8 th grader) “YouTube is an easy way to listen to music. Every new song just comes out and you just go to YouTube and you will find it.” (8 th grader)

Themes Sub-Themes/Idea Units	Number of Idea Units	Idea Units (%)	Samples
Conforming peer practice of technology use	8	3.6%	“Everyone is going to use (YouTube)... That’s where everybody listens to music. There is no other (better) place.”(6 th grader) “But everyone is using it (Facebook) ... That’s where everybody meets.” (6 th grader)
Facebook as an exclusive peer social space, excluding adults, in particular teachers’ presence	18	8.1%	“Facebook is too much of a social thing... Add my teacher? Oh my god, that’s embarrassing.” (two 6th graders) “To me, I just see teachers as teachers. I don’t really feel like they have their own personal life or stuff. So it’s kind of weird to have them on Facebook and see that they actually do something other than teaching.” (8 th grader)
Teens’ pragmatic approach to technology use			
Focusing on functionality of the technology	18	8.1%	“One thing they (the school) can do is...if they have laptops in classes, and they can give you the memory thing (USB drive) for the laptops...you can have all your stuff on that memory. Then you can take it wherever the classes are.” (8th graders)
Focusing on connectivity of the technology	12	5.4%	“They connect the laptop with a smart board and they can have whatever is on the screen of the laptop showing on the screen of...the SmartBoard so that everyone can learn; it makes things much clearer. It’s much better.” (8 th grader)
Focusing on affordances of the technology	4	1.8%	“It is good to have like 20 (USB drives for each student... But that is a lot of money for the school, we can also have a fundraiser. Over a couple of years, they can probably make this happen.” (8 th graders)
Bring resourceful of social media use	7	3.2%	“I use Tumblr every day and I have it on my phone. It’s like a blogging site...it’s kind of like twitter and blogging combined. So you can post a message and you can blog out pictures... It sounds like Facebook, but it looks totally different once

Themes Sub-Themes/Idea Units	Number of Idea Units	Idea Units (%)	Samples
			you see the site. It's more interesting than Facebook..."(8 th grader)
Teens' exposure to technology use for instruction and learning			
Technology use in the English Language Art classroom	0	0.00%	
Technology use in the Math classroom	12	5.4%	<p>"And sometimes we have computers in math classes. ...Often when we are doing First In Math..." (6th grader)</p> <p>"Our maths teacher uses a SmartBoard in class every day." (7th grader)</p> <p>"They have some games (that) are like fun. Some are just...trying to do math problems. They are trying to make it as fun as they can." (8th grader)</p>
Technology use in other subject classrooms	3	1.4%	"Usually (we have the Internet access) in science classes...when we are researching for a project." (6 th grader)
Technology use for learning and instruction at school in general	3	1.4%	"We have computers in the lab. But sometimes, they (teachers) have the tiny computers (tablets) and they can bring (computers) to different classrooms."(6 th grader)
Social media use at home for learning	7	3.2%	"If I'm doing homework; I'm struggling on something, I will look it up on YouTube. (If) I see someone post it and then I will know how to do it." (8 th grader)
Other technology use at home for learning in general	6	2.7%	"Say...you are trying to download something on the computer. (if) You don't know how exactly to do it, and if something comes up; you don't know how to do it. You just look it up (using Google) and figure out." (8 th grader)
Technology for literacy learning and instruction at home	2	1%	<p>"(I) do my homework on it (laptop), and (use it) to look up words." (6th grader)</p> <p>"Here, we have the [assignment] called</p>

Themes Sub-Themes/Idea Units	Number of Idea Units	Idea Units (%)	Samples
			Word Generation, so a lot of people forget to bring their books home. Everyone is like (asking their peers about the question on Facebook): ‘what is the (Word Generation) topic question?’ ...and their options” (of WG weekly controversial question) (two 8 th graders)
Teens’ attitudes towards technology for instruction and learning			
Ideas to integrate technology in instruction and learning	16	7.2%	“I think people would feel more comfortable if the school let us bring in our own technology(devices)(BYOD)... It would be good if we would be able to use our computers and stuff other than being in the class with 30 other kids, not being able to focus.” (8 th grader)
Pragmatic suggestions – technology use for learning and instruction	10	4.5%	“Well, I don’t really think phones are necessary. Just bringing the tablets and laptops would be a good idea...because you can use your phone anytime when you get out of school.” (8 th grader)
Suggestions to use alternative social media (to exclude Facebook) for learning and instruction	4	1.8%	“I think people should invent a new website for that, like-- You can work, and you can socialize too... Basically, it’s like a virtual classroom.” (two 6 th graders) “There is teacher website; it looks just like Facebook... I think it’s called Engrade... So...you could communicate with your teacher, like what is homework for tonight or if you are having a problem. That’s an easy way to communicate without having to go on Facebook.” (two 8 th graders)
Suggestion – technology for literacy instruction and learning	5	2.3%	“What we can do is that we can bring some technologies into the school, which don’t need the Internet. Like for readings, you can bring Kindle.” (8 th grader)

Appendix B

Table 2

Grade differences in students' communication and social media accounts (N = 531)

Communication and social media	Gr. 6 <i>M</i> (%)(<i>SD</i>)	Gr. 7 <i>M</i> (%)(<i>SD</i>)	Gr. 8 <i>M</i> (%)(<i>SD</i>)
Email	55(0.50)	49(0.50)	69(0.46)
Inst. Message	28(0.45)	26(0.44)	48(1.04)
Facebook	64(0.48)	69(0.47)	87(0.34)
Flickr	2(0.15)	02(0.13)	07(0.25)
Skype	22(0.42)	23(0.42)	41(0.49)
Twitter	39(0.49)	31(0.46)	43(0.50)

Note: Inst. message means instant message. The table is adapted from Li, Snow & White (2014)

Authors

Dr. Jia Li is an Assistant Professor at the Faculty of Education at the University of Ontario Institute of Technology, and a Canada-U.S. Fulbright Scholar at the Harvard Graduate School of Education from 2011 to 2012. Her research focuses on data-driven innovative language and literacy instruction using emerging technologies for linguistically diverse urban students. Email: <mailto:mjiali@uoit.ca>

Dr. Catherine Snow is the Patricia Albjerg Graham Professor at the Harvard Graduate School of Education. She focuses on conditions that support the development of language skills related to literacy success, especially for children and youth attending urban schools and those who do not speak the school language at home. Email: catherine_snow@gse.harvard.edu

Dr. Claire White currently serves as the co-developer and program director at the Collaborative for Educational Services, MA for Word Generation, an academic language program designed to improve reading comprehension and writing outcomes for struggling readers and ELs in grades 4-8. She completed her doctoral dissertation at the Harvard Graduate School of Education on Latino parents' support for their children's literacy development. Her research focuses on improving classroom instruction for language minority children. Email: claire.white@gmail.com



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